

Hepatitis A Outbreaks

Noele Nelson, MD, PhD, MPH

Team Lead, Division of Viral Hepatitis, NCHHSTP

Current Issues in Immunization Webinar

November 7, 2017

Hepatitis A Virus Outbreaks – United States, 2016–2017

- CDC has assisted in five hepatitis A virus (HAV) outbreaks since July 1, 2016
 - 2 Foodborne Transmission
 - 3 Person-to-Person Transmission
- Three Epi-Aids
- >1,600 outbreak associated cases reported since July 1, 2016
- Multiple ongoing outbreaks

California

- California is currently experiencing the largest person-to-person hepatitis A outbreak in the United States since the hepatitis A vaccine became available in 1996

- Epidemiology

Table. Outbreak Associated Hepatitis A infections by California Jurisdiction

Jurisdiction	Cases	Hospitalizations	Deaths
San Diego	536	369	20
Santa Cruz	74	33	1
Los Angeles	9	7	0
Other	14	7	0
Total	633	416	21

**CDPH Weekly
Update as of
October 27, 2017**

- Transmission- person-to-person and through contact with fecally contaminated environments
- Population- mostly homeless and/or persons who use injection or non-injection drugs
- HAV Genotype - IB

<https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Immunization/Hepatitis-A-Outbreak.aspx>

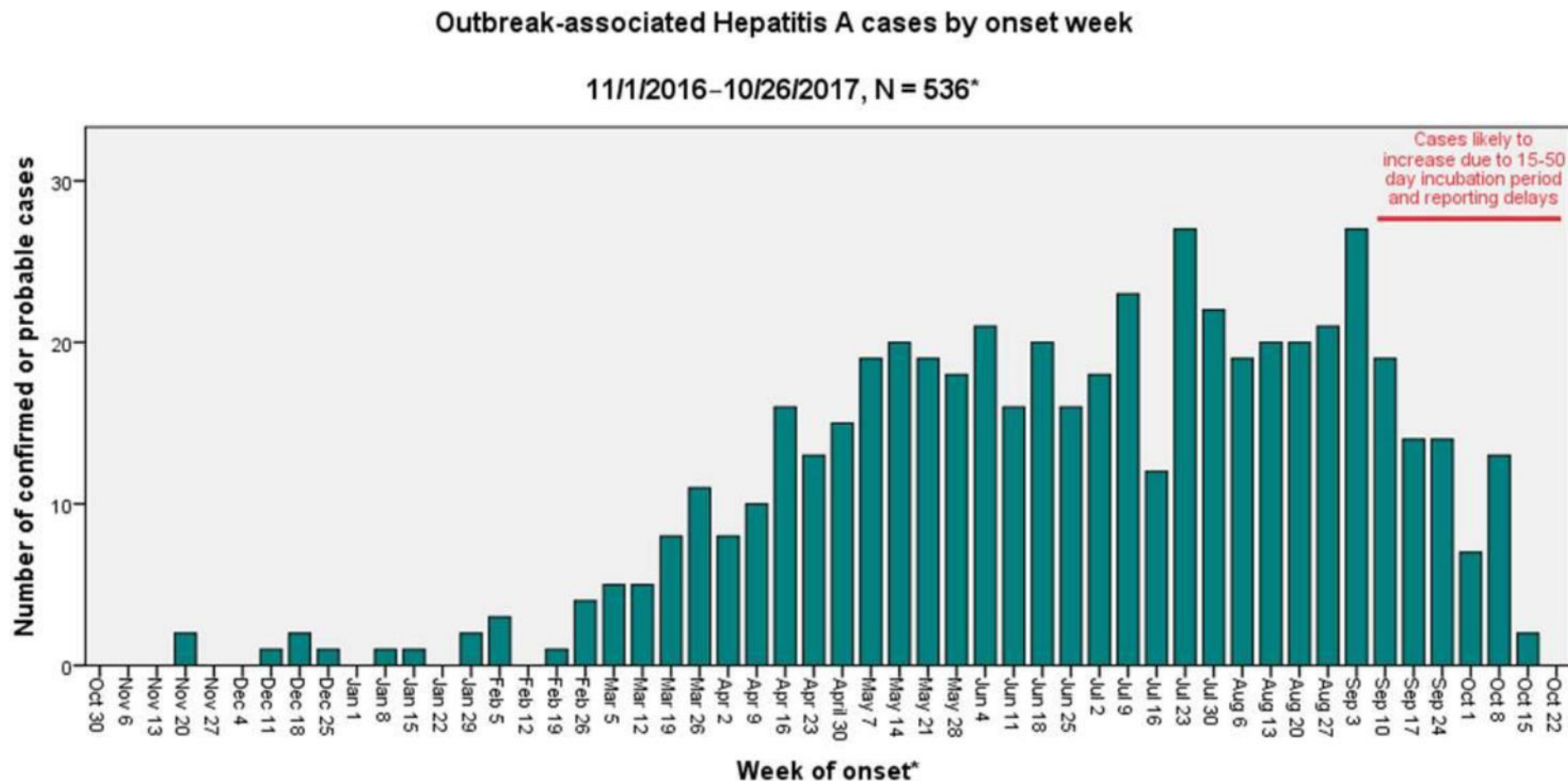
San Diego County

- Since early 2017, the Public Health Services Division, in the County of San Diego Health and Human Services Agency, has been investigating a local Hepatitis A outbreak
- September 1, San Diego County declared a local public health emergency
- **As of October 26, 2017**
 - 536 cases
 - 369 (68.8%) hospitalized
 - 20 (3.7%) died

Outbreak-associated hepatitis A cases by week of onset – San Diego

As of 10/31/2017

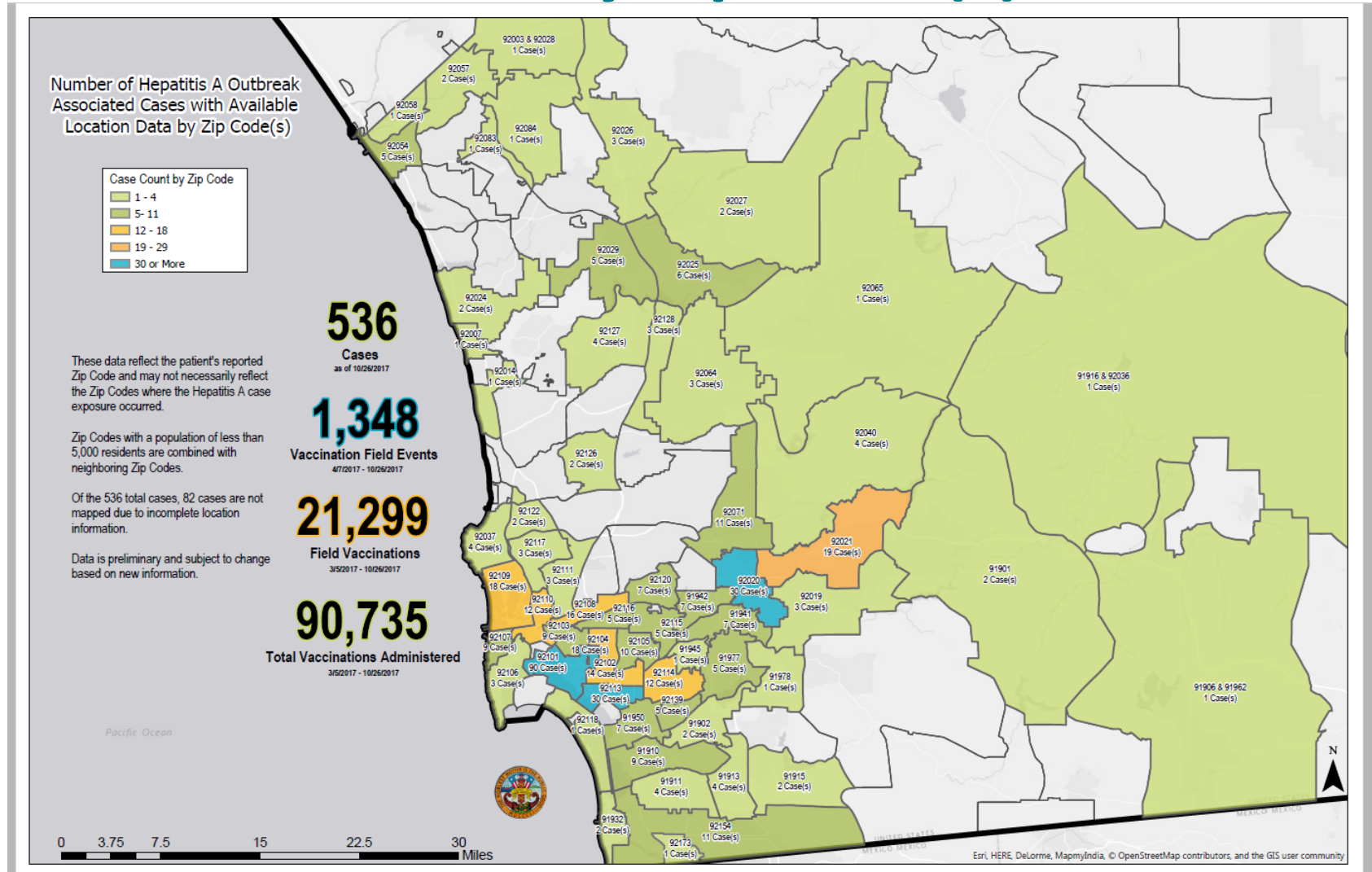
Of the 418 cases with test results available for review, 74 (18%) have **chronic hepatitis C infection**, and 22 (5%) have **chronic hepatitis B infection**



*Date of specimen collection or report used if onset date unknown; dates may change as information becomes available

San Diego County Map: Hepatitis A Outbreak Cases by Zip Code(s)

As of 10/26/2017



Utah

Outbreak-Associated Cases	60	
Onset Date Range	5/8/2017 - 10/28/2017	
Age Range	22 - 69 years, median age 40 years	
Hospitalization	32	53.3%
Deaths	0	0.0%
Risk Factors		
Homelessness and Drug Use	30	50.0%
Drug Use	12	20.0%
Homelessness	3	5.0%
Epi-Linked	8	13.3%
Travel	2	3.3%
Unknown	5	8.3%
Incarcerated	9	21.7%

Co-infection		
Hepatitis B (HBV)	8	13.3%
Hepatitis C (HCV)	18	30.0%
HBV & HCV	7	11.7%

Last updated 11/6/17

Michigan

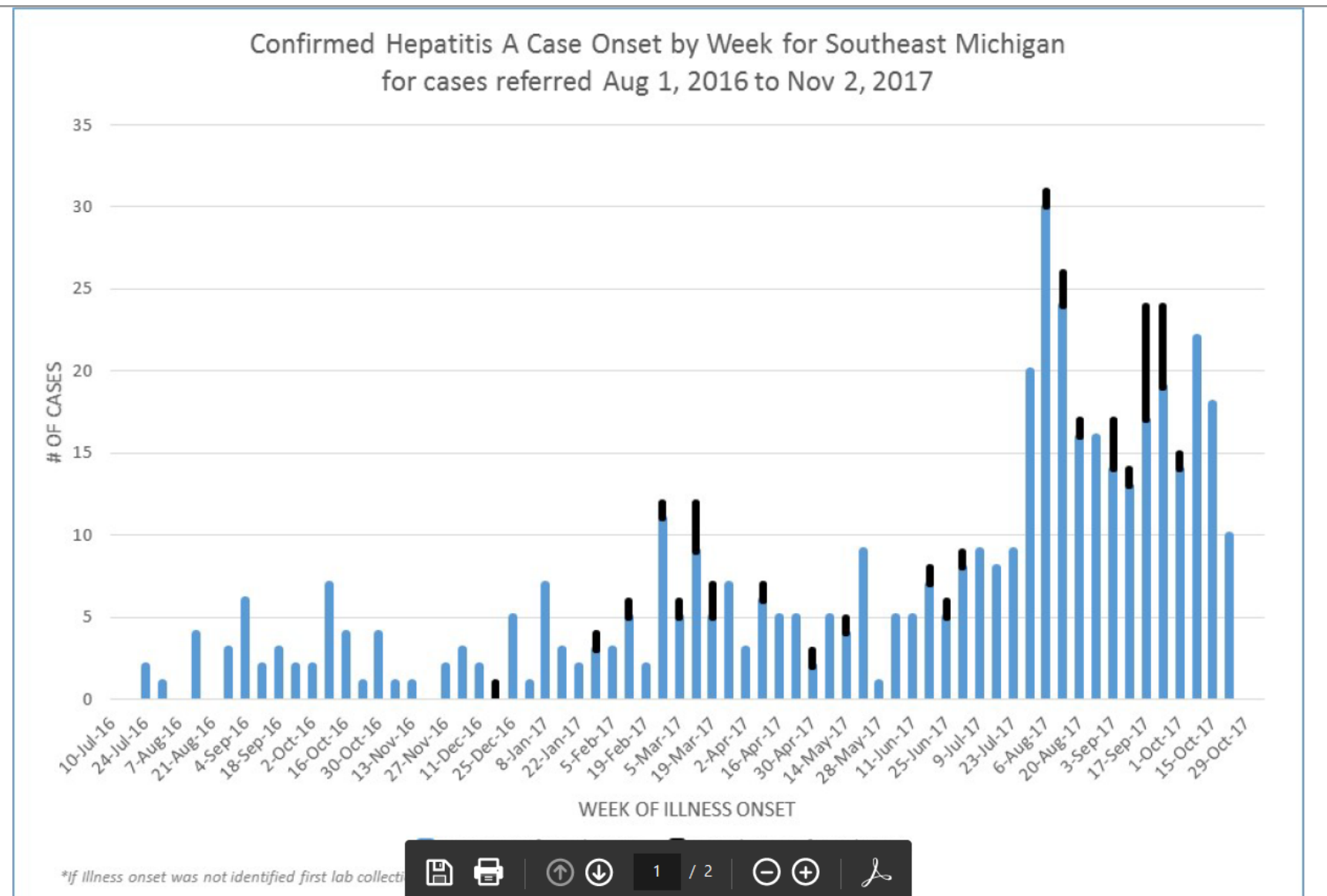
- Transmission- direct person-to-person spread
- HAV Genotype 1B
- Greater risk thought to be associated with:
 - Injection and non-injection drug use,
 - Homelessness or transient housing, and
 - Incarceration

Southeast Michigan Hepatitis A Outbreak Cases and Deaths as of November 3, 2017*

*Table will be updated weekly by 4:00pm each Friday

Cases	Hospitalizations	Deaths
486	409 (84.2%)	19 (3.9%)

Please note: Affected jurisdictions include City of Detroit, and Huron, Lapeer, Livingston, Macomb, Monroe, Oakland, St. Clair, Sanilac, Washtenaw & Wayne Counties. Table does not include all reported hepatitis A cases in the region; only those that are identified as outbreak-related. More descriptive data on the current outbreak can be found within the [Comprehensive Summary](#). Data are provisional and subject to change.

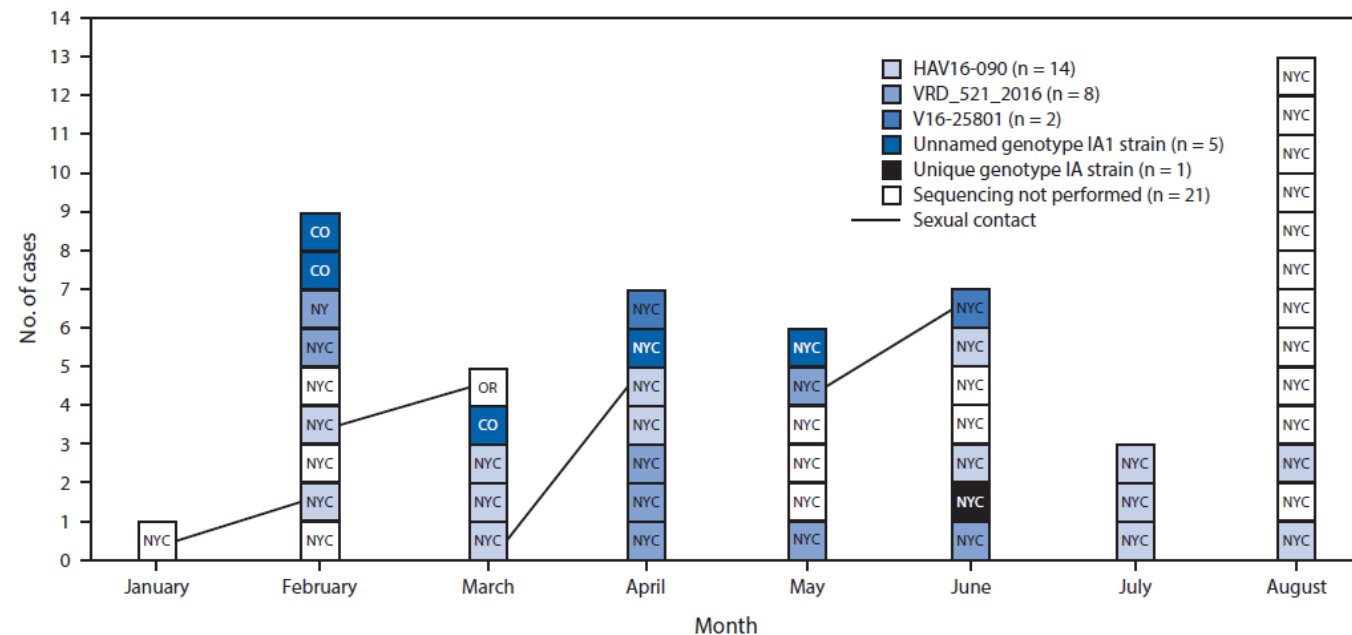


Report is a preliminary ad hoc analysis. Information to be considered DRAFT.

New York City, January – August, 2017

- Increase in reported hepatitis A infections among MSM, 51 cases
- Genotype 1A
 - 24/25 serum specimens matched strains circulating in Europe among European MSM

FIGURE. Number of reported cases of hepatitis A virus (HAV) infection involving men who have sex with men (N = 51), by state or city of residence, month of symptom onset, HAV genotype, and reported sexual contact — New York City, January–August, 2017



Abbreviations: CO = Colorado; NY = New York (non-NYC); NYC = New York City; OR = Oregon.

Shifting Hepatitis A Virus Epidemiology

- Past outbreaks were associated with asymptomatic children
- A large population of adults are not immune to hepatitis A virus
 - Prevalence anti-HAV, NHANES 2009-2010
 - Overall 26.5%
 - 22.2%, age 20-29
 - ~13.5%, age 30-49
 - 20.9%, age 50-59
 - 36.9%, age ≥60
- Older individuals are more likely to experience severe disease and adverse outcomes
- Vaccination uptake among at-risk adults is low
 - 2-dose Coverage for Ages 19-49 years (NHIS)
 - 2015, overall 12.3%
 - 2014, chronic liver disease, 18.2%

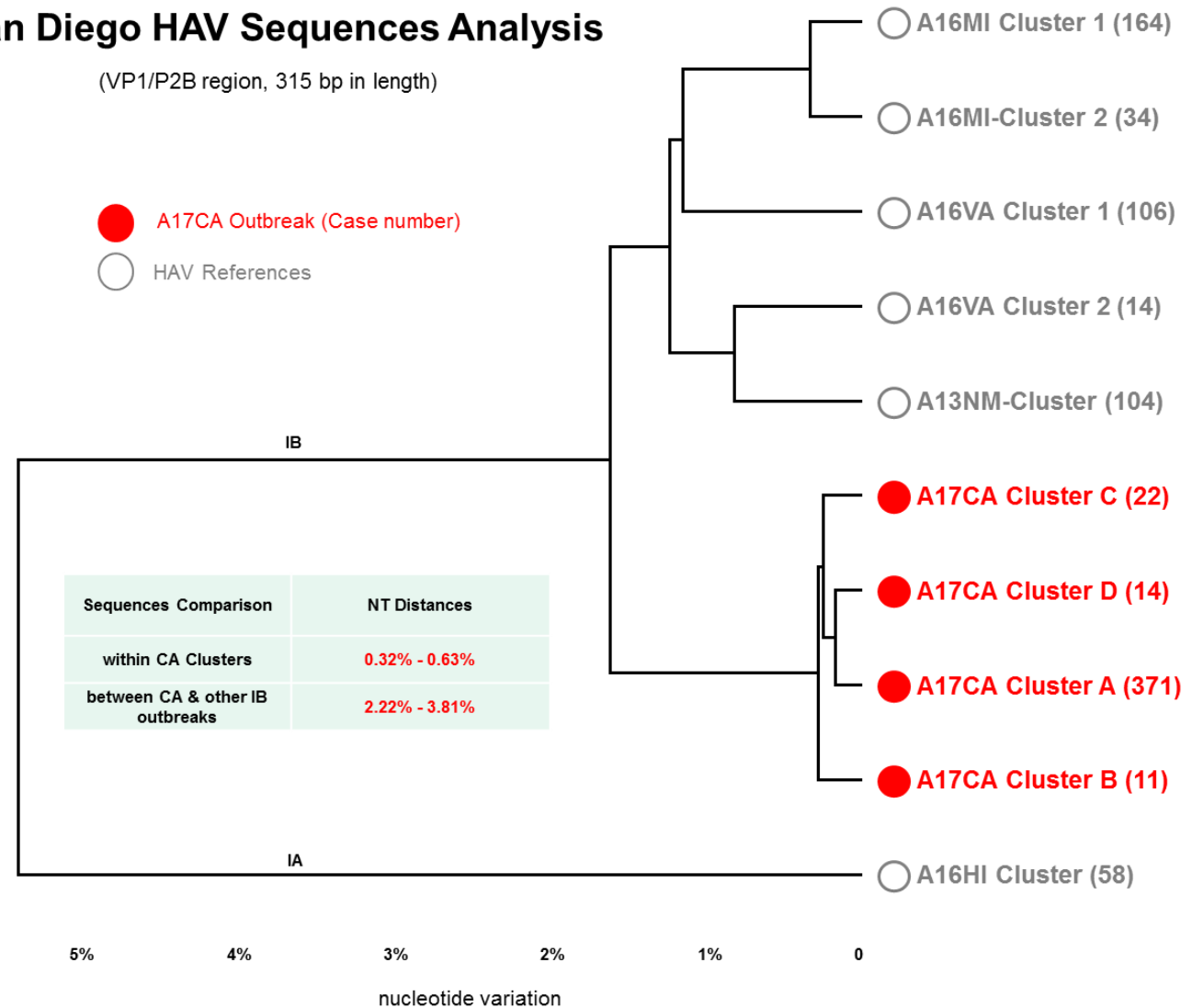
An Emerging Genotype?

- Genotype IA commonly circulates in North and South America
- Most recent outbreaks are genotype IB

San Diego HAV Sequences Analysis

(VP1/P2B region, 315 bp in length)

● A17CA Outbreak (Case number)
○ HAV References



ACIP hepatitis A Vaccine Recommendations

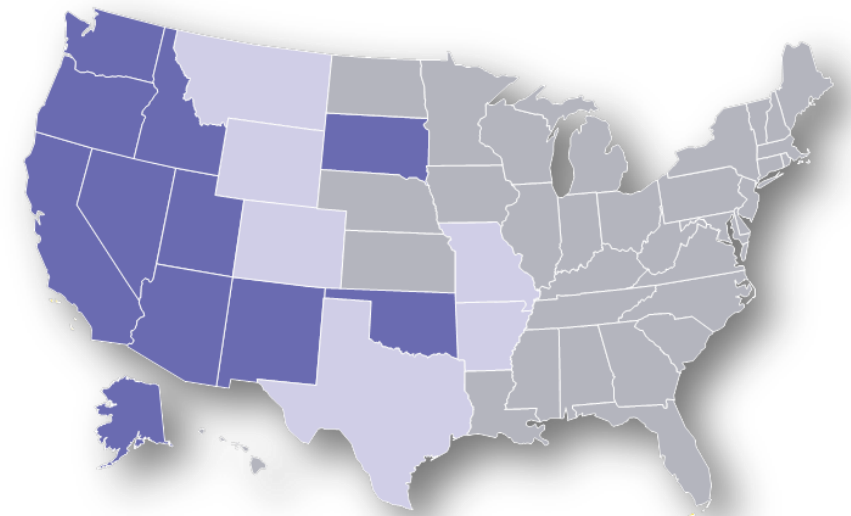
■ Targeted vaccination, 1996-1999

- 1996
 - Children at age 2 years in communities with high rates of disease
 - Children through teen years in outbreaks
- 1999
 - Recommended in 11 states with rates 2x the national average
 - Considered in 6 states with rates above the national average



■ Universal childhood vaccination, 2006

- Recommended for use at age 12-23 months in all states
 - Continue existing vaccination programs for ages 2-18 years
 - Consider catch-up vaccination in outbreaks and areas with increasing disease rates
 - Any person wishing to obtain immunity

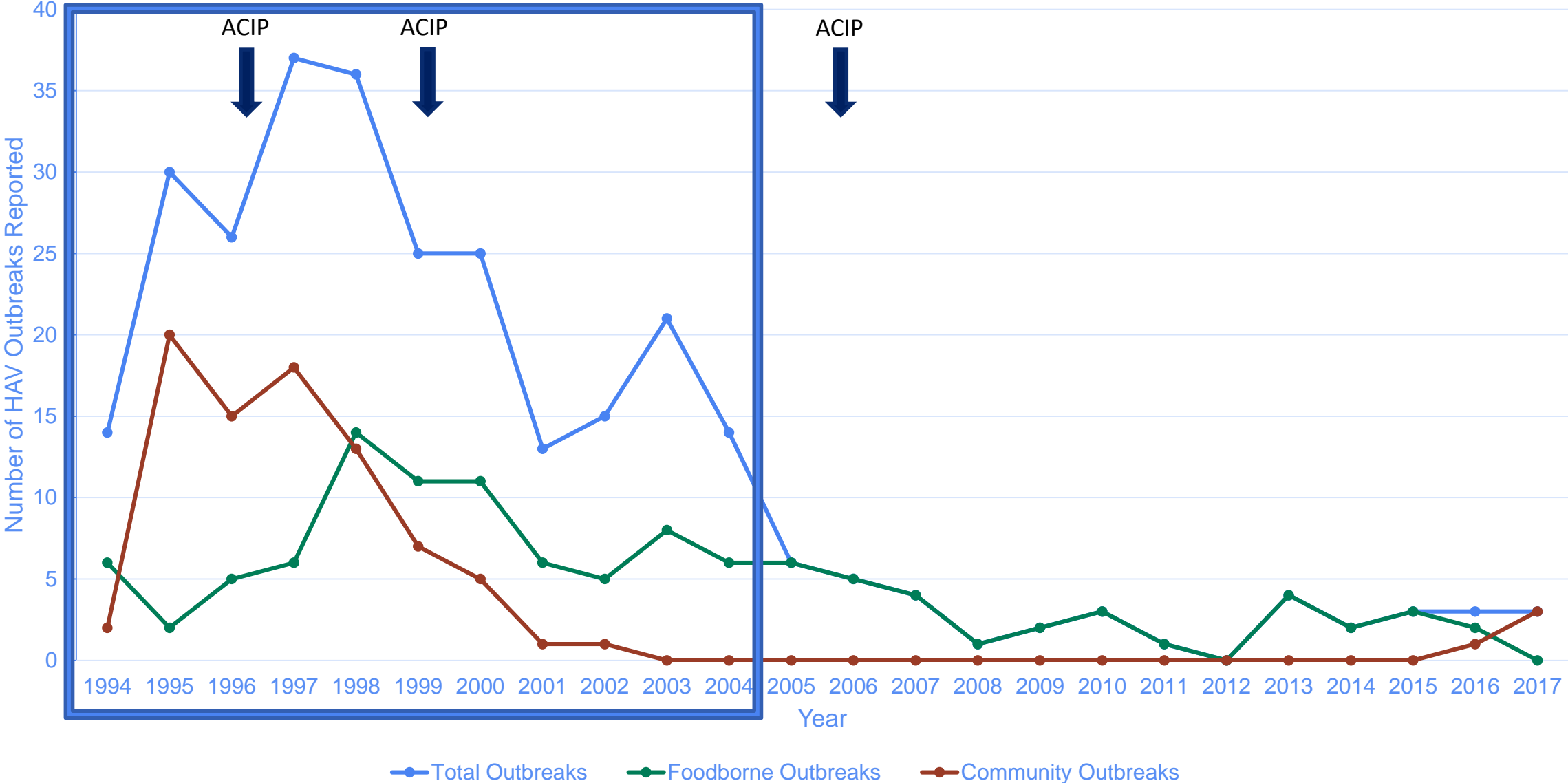


ACIP Hepatitis A Vaccine Recommendations

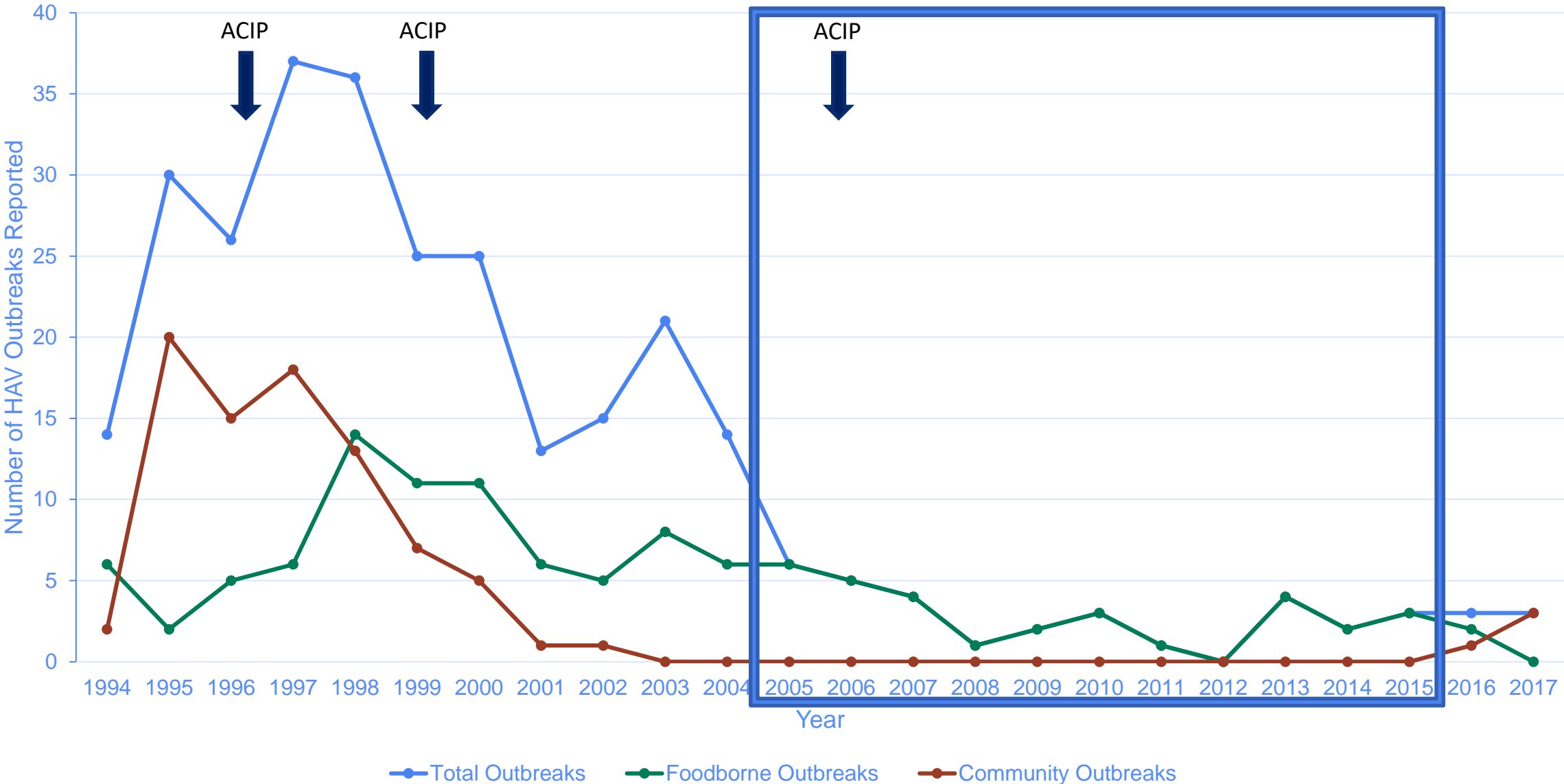
Groups at Increased Risk of HAV or Severe HAV Disease

- Travelers
- Men who have sex with men
- Users of injection and non-injection drugs
- Persons with clotting-factor disorders
- Persons who work with nonhuman primates
- Persons who anticipate close personal contact with an international adoptee
- Persons with chronic liver disease
- Post-exposure prophylaxis for healthy persons age 12 months-40 years

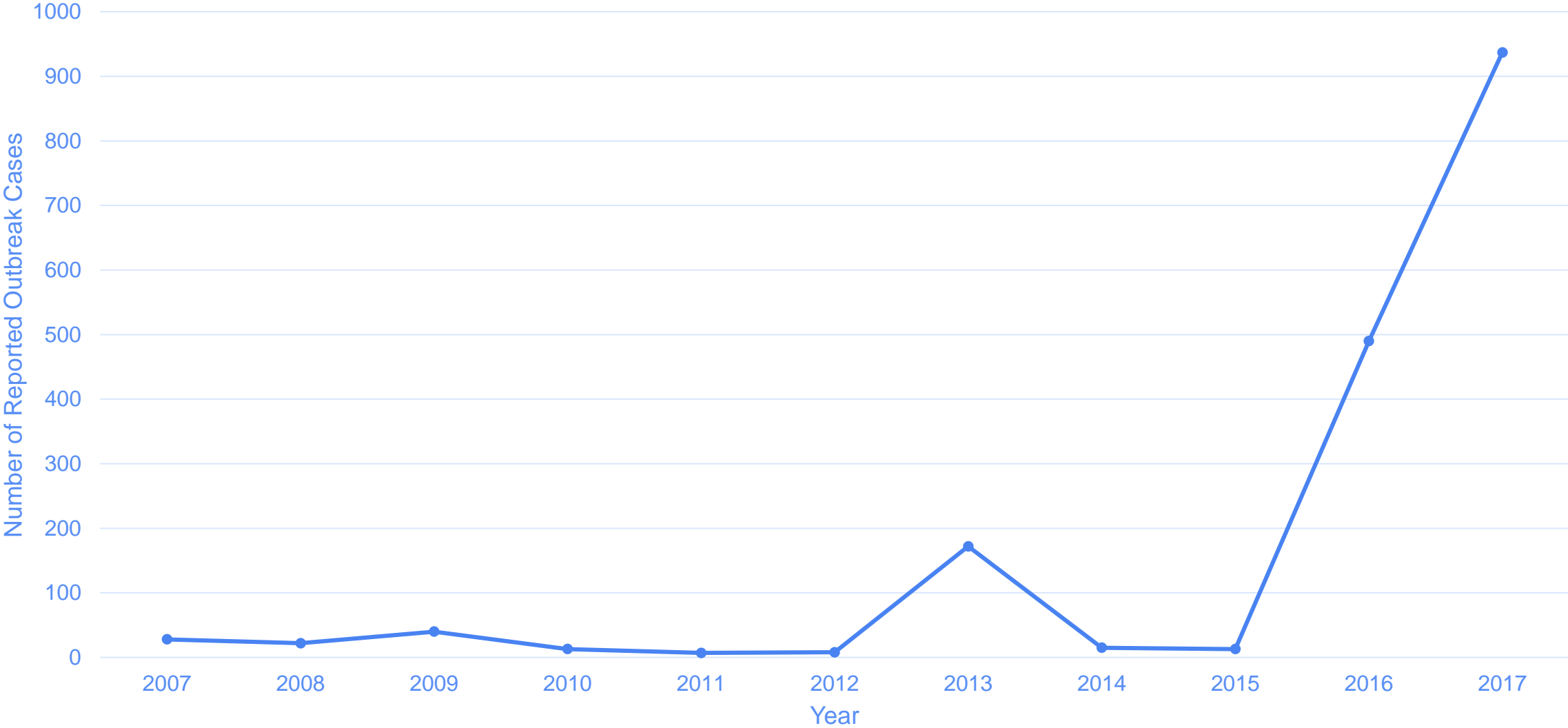
Hepatitis A Outbreaks Identified in the United States – 1994–2017



Hepatitis A Outbreaks Identified in the United States – 1994–2017



Reported Cases Associated with HAV Outbreaks – United States, 2007–2017



Vaccine Supply, I

- In light of the ongoing outbreaks of Hepatitis A among adults in the US, the demand for adult Hepatitis A vaccine has increased substantially over the past 6 months and vaccine supply to meet this unexpected demand in the US has become constrained.
- Both manufacturers are exploring options to increase domestic supply to address increased demand for the vaccine.
- Both manufacturers are working collaboratively with CDC to monitor and manage public and private vaccine orders to make the best use of adult Hepatitis A vaccine during this period of unexpected increased demand.
- To address constrained supplies, CDC staff are working directly with public health officials to provide guidance about how best to target vaccine distribution.
- These constraints do not apply to the pediatric Hepatitis A vaccine supply in the US.

Vaccine Supply, II

In terms of current product availability

- Merck:

- Supply of available Hepatitis A vaccine will be intermittent through 2017. Following an outage during part of October, orders are anticipated to ship beginning the week of 10/30.

- GSK's

- Pre-filled syringes are currently out of stock but a limited number of vials are available to order, with ordering controls in place.
- In addition, GSK is maintaining a limited medical reserve and continues to consult with public health officials to help support urgent public health needs.
- GSK anticipates limited resupply of pre-filled syringes in early/mid November 2017.
- Twinrix, GSK's combination Hep A/Hep B vaccine is currently available for order.

Hepatitis A Among Homeless Populations

- Little is known about hepatitis A immunity among homeless populations in the US
- Homelessness is not considered an independent risk factor for HAV infection
- Older age, duration of homelessness, and injection drug use may indicate HAV immunity

Considerations – Homeless

- Higher risk for high morbidity and death
 - Often have associated co-morbidities
 - Often have additional risk factors
 - Malnutrition
 - Alcoholism
 - Injection and non-injection drug use
 - Live in poor hygienic settings
 - Increased transmission
- Routine vaccination (e.g., shelters, ED visits) over time
 - Easier implementation than in outbreaks and less vaccine supply constraints
- Catch-up vaccine or universal hepatitis A vaccination discussed

References - I

- Poulos RG, Ferson MJ, Orr KJ, McCarthy MA, Botham SJ, Stern JM, Lucey A. Vaccination against hepatitis A and B in persons subject to homelessness in inner Sydney: vaccine acceptance, completion rates and immunogenicity. Aust N Z J Public Health. 2010 Apr;34(2):130-5. doi: 10.1111/j.1753-6405.2010.00496.x. PubMed PMID: 23331355.
 - Homeless people attending a clinic were offered hep A vaccine at 0 and 6 to 12 months and hep B vaccine on varying schedules and followed-up for 18 months from the first dose. Once starting the schedule, completion rates were high relative to other studies of vulnerable populations.
- Hennessey KA, Bangsberg DR, Weinbaum C, Hahn JA. Hepatitis A seroprevalence and risk factors among homeless adults in San Francisco: should homelessness be included in the risk-based strategy for vaccination? Public Health Rep. 2009 Nov-Dec;124(6):813-7. PubMed PMID: 19894423; PubMed Central PMCID: PMC2773944.
 - Reports on data and blood samples collected in 1999 on marginally housed and homeless adults. 52% of 1,138 tested were anti-HAV-positive. IV drug use, being foreign-born, being Hispanic, and increasing age were associated with anti-HAV positivity. Concluded that **homelessness may be an independent risk factor for anti-HAV positivity.**
- James et al., 2009. Response to hepatitis A epidemic: emergency department collaboration with public health commission
 - Summary of a response to a hep A outbreak in Boston among homeless, PWIDs, and incarcerated. The ED began offering hep A vaccine to everyone >21 years who was homeless, PWID, or incarcerated. The outbreak declined after.

References - II

- Nyamathi AM, Sinha K, Saab S, Marfisee M, Greengold B, Leake B, Tyler D. Feasibility of completing an accelerated vaccine series for homeless adults. *J Viral Hepat.* 2009 Sep;16(9):666-73. doi: 10.1111/j.1365-2893.2009.01114.x. Epub 2009 Feb 24. PubMed PMID: 19245384; PubMed Central PMCID: PMC3780569.
 - Describes parent study (also discussed in Nyamathi et al. 2012 and Greengold et al. 2009) looking at interventions to increase HAV/HBV vaccination in homeless adults. It found that completion rates were higher for a 2-dose series in 2 months vs. a 3-dose series in 6 months and that the group that got nurse case management was more likely to complete either series.
- Nyamathi AM, Marlow E, Branson C, Marfisee M, Nandy K. Hepatitis A/B vaccine completion among homeless adults with history of incarceration. *J Forensic Nurs.* 2012 Mar;8(1):13-22. doi: 10.1111/j.1939-3938.2011.01123.x. Epub 2012 Jan 6. PubMed PMID: 22372394; PubMed Central PMCID: PMC3359373.
 - Describes interventions aimed at increasing vaccination rates among homeless/formerly incarcerated men in LA County. Participants were divided into study arms that included combinations of nurse case management, incentives, and tracking.
- Nyamathi A, Salem BE, Zhang S, Farabee D, Hall B, Khalilifard F, Leake B. Nursing case management, peer coaching, and hepatitis a and B vaccine completion among homeless men recently released on parole: randomized clinical trial. *NursRes.* 2015 May-Jun;64(3):177-89. doi: 10.1097/NNR.0000000000000083. PubMed PMID:25932697; PubMed Central PMCID: PMC4418035.
 - RCT looking at use of peer coaching and nurse case management to increase HAV vaccination among recent parolees.
- Greengold B, Nyamathi A, Kominski G, Wiley D, Lewis MA, Hodge F, Singer M, Spiegel B. Cost-effectiveness analysis of behavioral interventions to improve vaccination compliance in homeless adults. *Vaccine.* 2009 Jan 29;27(5):718-25. doi: 10.1016/j.vaccine.2008.11.031. Epub 2008 Nov 27. PubMed PMID: 19041351; PubMed Central PMCID: PMC2772200.
 - Based on the clinical trial described in Nyamathi et al. 2009. Looked at combined HAV/HBV vaccination in homeless persons. No results presented for HAV alone because the model did not demonstrate HAV vaccination under any strategy to be cost-effective.

Acknowledgments

▪ **Division of Viral Hepatitis**

- Jeff Efird
- Monique Foster
- Megan Hofmeister
- Scott Holmberg
- Cynthia Jorgensen
- Alaya Koneru
- Blythe Ryerson
- Phil Spradling
- Eyasu Teshale
- Brigitte Ulin
- Claudia Vellozzi
- John Ward
- Winston Abara (former DVH EIS Officer)
- CDC Division of Emergency Operations

▪ **Immunization Services Division**

- Jeanne Santoli
- Cindy Weinbaum
- Frank Whitlatch
- Nathan Crawford

▪ **Division of Viral Hepatitis Laboratory**

- Tonya Hayden
- Yulin Jin
- Saleem Kamili
- Yury Khudyakov
- Amanda Poe
- Lili Punkova
- Sumathi Ramachandran
- Guo-Liang Xia

▪ **County of San Diego Health and Human Services Agency**

▪ **California Department of Public Health**

▪ **Utah Department of Health**

▪ **Michigan Department of Health and Human Services**

▪ **New York City Department of Health and Mental Hygiene**

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

